tamp appropriately, and decompression or recompression operation are not necessary.

Please refer to FIG. 6(B). In this example, two source data streams S1, S2 are collected together selectively. Similar to the first example, in this example, segments P3, PS, P1 only need to adjust timestamp, and decompression and recompression are not necessary. Therefore, the operations in FIG. 6(B) can be converted into 'T.Add(S1.P3, t1)', 'T.Add (S2.P5, t2)', and 'T.Add(S1.P1, t3)'.

Please refer to FIG. 6(C). In this example, operation f1 is performed to segment P1 of the source data stream S1 and, afterwards, the result is added to T. After operation f1, the P1 is suitably decompressed and recompressed. Segment P3, however, only needs to be modified in timestamp. The operations in FIG. 6(C) can be converted into 'T.Add(S1.P3, t1)', 'T.Add(f1(S1.P1), t2)'.

Please refer to FIG. 6(D). In this example, P3 and PS of the source data stream S1, S2 are manipulated by reference operation f2 before being added into T data stream. The reference operation f2 may be the operation of "transition" described in FIG. 5(A). Another parameter t3 of f2 represents that the last part of segment P3, i.e. P3[t_{p3}-t3:t_{p3}], and the forefront part of segment P5, i.e. PS[0:t_{p5}], are performed by the "transition". Parameters P3[0:t_{p3}-t3] and P5[t3:t_{p5}] only need to be modified in timestamps, and need not be decompressed or recompressed in this example. The editing in FIG. 6(D) can be converted into 'T.Add(S1.P1, t1)', 'T.Add(f2(S1.P3, t3), t2)'.

Referring now to the flowchart in FIG. 7, the user first sets operating command (step 71) through the user interface as one shown in FIG. 4(B). Next, the application interprets the user's operating command to a series of basic operations (step 72), e.g. 'Add', 'f1', 'f2' shown in FIG. 6(A) to FIG. 6(D). Next, the application tests if multiple threads are needed to process these basic operations (step 73). If the basic operations are only "Add's," timestamp is modified selectively (step 7311), and the modified segments are added into the target data stream (step 7312).

When the basic operation belongs to type of 'f1(P, t)', P segment is decompressed (step 7321), and then operated by f1 (step 7322), and then recompressed (step 7323). Afterwards, steps 7311, 7312 and 7313 are successively performed.

When the basic operation belongs to type of 'f2(P1, P2, ts)', since P1 and P2 respectively have portions need decompressing and portions unnecessary of decompressing, the step 7331 separates the segment into sub-segments. In other words, the last part of segment P1, i.e. P1[t_{p1}-ts:t_{p1}], and the forefront part of segment P2, i.e. P2[0:ts] need to be decompressed to perform the "transition". In contrast, P1[0:t_{p1}-ts] and P2[ts:t_{p2}] only need to be modified in timestamps, and need not be decompressed or recompressed. Therefore, to different needs, different desired processes to different segments are performed (step 7332).

Next, modification to timestamps of P1[0:t_{p1}-ts] and P2[ts:t_{p2}] are made (step 7333, step 7336). In contrast, the last part of segment P1, i.e. P1[t_{p1}-ts:t_{p1}], and the forefront part of segment P2, i.e. P2[0:ts] are decompressed respectively (step 7334, step 7335). The decompressed segments are then manipulated by a "transition" operation (step 7337), and the result is recompressed (step 7338). Then, the result of steps 7333, 7338 and 7336 are combined (step 7339). Next, steps 7311, 7312 and 7313 are successively performed. Of course, if there are other operations needed to operated in step 7313, then step 73 is performed. After completing operations mentioned above, the target compressed data stream is obtained efficiently (step 7314).

With above description, persons skilled in the art are able to implement the present invention. It is to be noted that besides the MPEG video data stream and audio data stream described here, any compressed data stream can use the present invention to improve the efficiency of processing the compressed data stream and reduce error propagation brought by lossy compression methods.

FIG. 8 shows how the present invention applies to the MPEG video data stream. As mentioned above, the compression method of the MPEG video data stream is not only an intra-frame compression but also an inter-frame compression. In other words, there is relationship between MPEG frames, as shown in FIG. 1(E).

When retrieving segments of frames from the compressed data stream and one frame of the segment is compressed by referencing to preceding or succeeding frames, then it is typically necessary to decompress the corresponding reference frames before processing this frame. According to the present invention, the frames to be processed are separated into two groups, as shown in FIG. 8. The frames of the first group 81 are not reference of other frames, and therefore the frames of the first group 81 need not to be decompressed. The frames of the second group 82 are reference of other frames, and therefore the frames of the second group 82 need to be decompressed. By this way, unnecessary decompression is avoided and time is saved. Additionally, unnecessary error propagation of lossy compression is reduced.

It is to be noted that the above embodiments are only used to describe the example of the present invention. For succinctness purpose, functions or operating elements in the present invention system that belong to the prior art may not be described in detail here.

It is to be noted that the present invention may be applied in different forms. For example, users may interact with the system of the invention through any input devices, such as keyboards, mice, light pens, etc. Similarly, the present invention can combine with personal computers, personal digital assistants, notebook computers, mobile phones, digital cameras, etc. These electric devices can be used in any operating systems, such as any version of Windows, Palm OS, MacOS, OS/2, BeOS, Linux, UNIX, etc.

Accordingly, the above disclosure should be construed as limited only by the appended claims.

What is claimed is:

1. A system for processing a source compressed data stream that has a first group of source segments and a second group of source segments, the system comprising:

a first processing unit for selectively modifying a status of said first group of source segments to generate a first group of target segments; and

a second processing unit for performing an operation on said second group of source segments to generate a second group of target segments, the second processing unit comprising:

a decompressing unit for performing a decompression on said second group of source segments to generate a group of decompressed source segments;

an operating unit for performing an operation on said group of decompressed source segments to generate a group of uncompressed target segments; and

a recompressing unit for performing a recompression on said group of uncompressed target segments to generate said second group of target segments.

2. The system of claim 1 further comprising a dispatching unit for separating said source compressed data stream into said first group of source segments and said second group of source segments.

3. The system of claim 1 further comprising an integrating unit for combining said first group of target segments and said second group of target segments to generate a target compressed data stream.

4. The system of claim 1 wherein said status of said first group of source segments comprises a timestamp.

5. The system of claim 1 wherein said second processing unit refers to a parameter data segment while performing said operation.

6. The system of claim 5 wherein said parameter data segment is decompressed from another source compressed data stream.

7. The system of claim 1 wherein said operation is to change said group of decompressed source segments according to a rule.

8. The system of claim 1 wherein said operation is to mix data into said group of decompressed source segments.

9. The system of claim 1 wherein said source compressed data stream is a Moving Picture Experts Group (MPEG) video data stream.

10. The system of claim 1 wherein said source compressed data stream is a Moving Picture Experts Group (MPEG) audio data stream.

11. A method for processing a source compressed data stream comprising the steps of:

separating said source compressed data stream into a first group of source segments and a second group of source segments;

selectively modifying a status of said first group of source segments to generate a first group of target segments; and

performing a manipulation on said second group of source segments, said manipulation comprising steps of:

decompressing said second group of source segments to generate a group of decompressed source segments;

performing an operation on said group of decompressed source segments to generate a group of uncompressed target segments; and

performing a compression on said group of uncompressed target segments to generate a second group of target segments.

12. The method of claim 11 further comprising the step of combining said first group of target segments and said second group of target segments to generate a target compressed data stream.

13. The method of claim 11 wherein said status of said first group of source segments comprises a timestamp.

14. The method of claim 11 wherein said operation refers to a parameter data segment.

15. The method of claim 14 wherein said parameter data segment is decompressed from another source compressed data stream.

16. The method of claim 11 wherein said operation is to change said group of decompressed source segments according to a rule.

17. The method of claim 11 wherein said operation is to mix data into said group of decompressed source segments.

18. The method of claim 11 wherein said source compressed data stream is a Moving Picture Experts Group (MPEG) video data stream.

19. The method of claim 11 wherein said source compressed data stream is a Moving Picture Experts Group (MPEG) audio data stream.

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